National Laboratory, MIT, and Rockwell International; and device construction by Raytheon, Varian Associates, Inc., and a division of Hughes Aircraft Company. The aim of the program was to develop continuous-wave (cw) gyrotrons—devices that could produce high power for long periods—and incor porate them into heating systems for fusion devices.

The program has produced a valuable technology base that includes both high-power, high-frequency microwave systems and a cadre of researchers with knowledge in microwave engineering, high-voltage power supply engineering, and microwave physics.

This technology base extends beyond the laboratory to industry. Varian and General Atomics have cooperated in the development and testing of a large, high-power tetrode tube at frequencies over 100 MHz for the JT-60 fusion experiment in Japan.

In materials processing, micro wave sintering, illustrated below, produces high-density, high-strength ceramics. Chemical processing with microwave sources has been used to prepare ultrapure materials by vapor reaction from the walls of the processing chamber. The gyrotron can serve as a widely tunable source for use in high-resolution spectro-scopy, and the gyrotron amplifier has been selected by the Department of Defense for development as a source of high-power radiation for a novel radar system.